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Horticultural Education.

A CORRESPONDENT referring to Professor Bailey's article upon the value of horticultural education, desires to be informed just what is meant by that phrase. It may be answered in a general way that one could appropriately be called educated in horticulture when he had an adequate schooling in the accepted theories of horticulture or in the sciences related to horticulture as distinguished from a mere familiarity with the practice or art of horticulture. Of course it is not expected that a young graduate will be an expert in chemistry, botany, entomology and all the other sciences which furnish explanations for the best garden practice, but he should have a rudimentary knowledge that will enable him to understand what explorers in each of these fields are looking for and finding, and to apply these discoveries to his daily practice. Above all, he should have the broadened intelligence, the more cautious and accurate judgment and the more alert and fruitful imagination which scientific training brings.

Now there is no specific course of instruction which would be the best for all who purpose to devote themselves to horticulture. The best training would vary according to the mental bias and capacity of the student, the particular branch of horticulture he wished to prosecute, and so on. It will be set down as established, however, that a fair general education is the best possible foundation for any special training. The course of agriculture in Cornell University, as we have learned from Professor Bailey, is based upon this idea. The two years of general training are meant to establish habits of study and direction of thought. They embrace a thorough training in English, with instruction in French or German or both, mathematics, elementary chemistry and botany, zoology, entomology, physiology and hygiene, physics, free-hand drawing and logic. Upon completion of the second year the student is allowed to make selections from optional studies. If he takes a course in general farming he selects studies in that direction, or he may choose agriculture, chemistry, economic entomology, veterinary science and practice. He may also select studies from the purely scientific and literary course, but at least three-fourths of the work in the last two years must be devoted to subjects directly relating to agriculture.

If he selects horticulture as an optional study he pursues the study of botany in considerable detail, and he is then afforded the following courses:

1. Variation of Plants under Culture. A discussion of the principles which underlie the modification and amelioration of plants under the hand of man. The course includes the consideration of acclimatization, the modification of plants by latitude and climate, pollination and hybridization, selection, influences of soils and treatments, histories of cultivated plants, etc. Lectures.

Course 1 is open to all students in all courses who have taken Systematic Botany.

2. Olericulture, or Vegetable Gardening; including also a full discussion of forcing and forcing structures. Lectures and other class work. Laboratory work.

3. Pomology. Lectures and other class work. Practicums once a week.

4. Handicraft. Practical training for students who intend to follow gardening as a business. An extension of either Course 2 or 3, or both.

5. Investigation incident to previous courses. For graduates and advanced students.

The last two courses are flexible and adapted to the convenience of both professor and student, and they allow one to take up advanced studies in the particular directions of proposed work. The students in these courses are few, but it is here that the skill of the teacher is best shown, and special adaptability of the student more plainly appears. Here the teaching is not didactic; teacher and student work hand in hand. Students in these advanced courses become more than mere graduates. Just now three young men are taking under the last course a special training in crossing and hybridizing, which is extended through several months.

In connection with all the courses general reading on the various subjects discussed is required and examinations are held upon books which have never appeared in the class room. Actual practice is exacted in connection with all technical courses, and excursions are taken to good orchards, nurseries and gardens in various parts of the country. Besides the above courses similar ones are afforded in arboriculture and landscape-gardening, and the practical work is aided by the use of the orchards, the vegetable-gardens, ornamental grounds, forcing houses and greenhouses connected with the University.

No college course extending over two or three years will suffice for the training and equipment of a first-rate gardener, but any young man would surely be better prepared for gardening with such a schooling than without it. With it, he would at least be less opinionated, more ready to be taught, more alert to discover improved methods of practice, and more prompt to adopt them; he would be at once more modest and more truly self-reliant.

THE movement for the establishment of a State Board of Trustees empowered to acquire and hold for public use and enjoyment historic sites, tracts of interesting scenery and open spaces of any desirable kind, which was recently started in Massachusetts by the Appalachian Mountain Club, ought to have far-reaching results. Any such exhibition of interest in the preservation of natural scenery is encouraging, as evincing capacity for pleasures which are in no degree sordid or material, and as indicating, perhaps, a slight gain in the higher elements of life and civilization. The wish to do what is thus proposed is, no doubt, a natural result of the out-of-door activities of the Club. It has been awakened in the minds of the members by personal contact with nature, and by their familiarity with interesting and beautiful scenery. It will probably be found

easier to inspire interest in the acquisition of historic sites than in the other objects of the undertaking. This part of the enterprise will come nearest taking care of itself.

The popular interest in the preservation of scenery, and the popular appreciation of the value of opportunities for change of scene and for contact with unspoiled natural beauty and calm, are but slight, but they admit of cultivation and development. An increasing and enormous density of population is certain, within a few decades, to develop conditions of life in all our older states which only thoughtful men and women now foresee. Our country is rapidly becoming a land of cities and towns. As people are, more and more, obliged to live and work in thronged and crowded communities, the need of occasional escape from the pressure of toil, and of recreation, by experience of the silent unconcern of nature, becomes more imperative. The most important among the objects of this movement is the acquisition of open spaces, places where the people of the towns can breathe, and the establishment of conditions under which they will be permanently available for public use. Their management and embellishment can be considered afterward. They will reflect the taste and civilization of the people of the state. But it is always appropriate to say that in such places we do not want statues or fine buildings or decorative artificial gardening. All these are impertinences, but trees and grass, rocks and streams,

"The wide, aërial landscape spread,"

the open air, the sky and sea—these have the power to heal and soothe and charm.

The movement should be made broad enough from the beginning to include and enlist all who appreciate out-of-door interests and objects of any kind, the preservation of natural scenery, the care of trees, forests and wooded lands, and of fish and game preserves, the purity of the water-supply for cities and towns, the treatment of roadsides, and of mountain and sea-shore commons and public parks and open spaces. The development and direction of popular interest in the objects of the undertaking will require and reward persistent effort. The work has been very happily begun, and all public-spirited citizens of the commonwealth should help to make it successful.

The North-western Lumberman, a trade journal published in Chicago, has for years been endeavoring to turn into ridicule every statement which has been made with regard to a probable failure of the pine supply of the north-west. To our enterprising contemporary the forests of the lake region were boundless and inexhaustible, and the men who ventured to suggest that even an American forest, if a hundred times as much lumber was cut from it every year as the annual increase of the trees produced, must in time come to the end of its productive powers, were set down as cranks or alarmists, or something worse. It is interesting, therefore, and exceedingly suggestive, to find in a recent issue the following statements:

The most conspicuous feature of the present season's lumber trade in the north-west is the comparative scarcity of what, in this market, is called good lumber—that is, lumber that will grade C and better. Not two years ago selects and uppers were the druggiest lumber going, stocks in this market having been large, so that dealers made sacrifices of price to get rid of such stock.

A decided change has come in respect to good lumber. Men who two years ago scouted it as a drug cannot now obtain it without special effort. Time was when dealers expected to get a fair proportion of good lumber with the inferior grades, and that without difficulty in the open market. Now they have to go on a still hunt for good stock. The fact is that good lumber is getting scarce, and dealers who want to handle it are put to their wits' end to procure it in sufficient quantity unless they choose to bull the market in competition with other buyers.

The result of this more recent development in the trade is to reduce the average quality of stocks that are thrown on the open market. There is plenty of coarse lumber, and the tendency is to a constantly overloaded market for such product.

The Carob Tree.

THE illustration on page 323 represents a specimen of the Carob-tree or Carubier of the French—the *Ceratonia Siliqua* of botanists—taken in Algeria. The Carob is a widely distributed plant of the Mediterranean Basin from Spain to the Orient, but more especially of northern Africa, where it grows in all sorts of soils and situations from the slopes of the driest limestone mountains to the most fertile oases. It is not common, however, even in Algeria or in Tunis, and grows as an isolated specimen, or in groups composed of a few individuals. The Carob is one of the most beautiful and useful trees of the countries which it inhabits. It grows to the height of forty or fifty feet, with a stout trunk, and a compact head of dark green, lustrous evergreen foliage. The flowers are not at all conspicuous or showy, resembling somewhat in size and arrangement those of our Three-thorned Acacias, to which the Carob is rather closely related botanically. The fruit is a thickly curved pod, and when it is ripe the seeds are encased in a sweet pulp, which is eaten by the people of the countries where the tree is found. The great value of the fruit of this tree, however, is to feed to horses and hogs, which fatten on them rapidly; and great quantities of Carob-pods are exported from Crete and other eastern countries to central and northern Europe, especially to Great Britain, for this purpose. The pulp has been found to contain sixty-six per cent. of pure sugar and gum, and it has been used in the manufacture of syrups, liquors, and an imitation of chocolate, and by the Egyptians in preparing a sort of sugar used by the Arabs; the pods, too, are preserved in the same manner that the pods of the Tamarind are preserved in India and other tropical countries.

There is considerable historical interest attached to the Carob; the fruit was once supposed to be the food which supported Saint John in the wilderness, the seeds being held to mean "locusts," and the pulp "wild honey," so the tree or its fruit came to be called "St. John's Bread;" and the dry valves of the pods have been considered the husks the Prodigal Son longed for in the last stages of his misery and starvation.

The wood of the Carob is hard, heavy, very durable, and of a handsome rose color. It is admirable furniture-wood, and is used locally for carts and agricultural implements. Its rarity is the only cause which prevents it from being used very generally in construction and the arts.

The Carob, as it flourishes in all sorts of soil, and is able to withstand drought and other hardships, is often planted, especially in the Orient and in Africa, for the grateful shade its heavy foliage affords, as well as for its valuable fruit. This tree was early introduced by the Spaniards into Mexico and South America, and the experiments which have been made of late years with this tree in California seem to indicate that it may be depended on in that state, where its more general cultivation on ground too stony or too sterile to produce other crops can be recommended.

Our illustration is made from an Algerian photograph, for which we are indebted to Mr. Francis Skinner, of Boston.

Signs of Intelligence in a Madeira Vine.

TWO or three years ago I began, without any great seriousness, experiments on some Madeira vines, which presently began to prove more interesting than was anticipated. Before this my attention had been attracted to peculiar movements made by this plant in the course of its spiral ascent of a stick. If allowed to grow a few inches above this support the extremity of the plant will sway backward and forward a few hours and then will enter upon a regular revolving movement, always from right to left to or contrary to the direction in which the hands of a watch move. One revolution consumes about three hours.

One of my plants began to grow on April 1st, and at the end of fourteen days was twelve inches tall and showing signs of uneasiness—now bending away from a vertical position and again standing nearly upright. On the 16th it was eighteen inches high, and being too top-heavy to stand erect, it began to fall away from the pot, which stood upon a table, toward the floor. This was done gradually and apparently with conscious care. It seemed to feel at times that it was letting itself down too fast, when it would stop with a jerk, like a nodding child, half asleep. When near the floor it began describing elipses, about three inches in diameter, with its upturned extremity. On the 19th it was twenty-six inches in length, and would describe a crescent-shaped loop, seventeen inches in length by six inches in breadth in about two hours. On the 23d it was three feet and four inches long, revolved with less regu-

larity, and at times drooped as if weary or discouraged in trying to find something upon which it might entwine itself.

Thus far no opportunity had been given the plant to climb, since it was desirable to see what it would do to meet the absence of some support. On the 26th a new route of travel was undertaken at six o'clock in the morning, and at nine o'clock the extremity, which was near the floor, at the left side of the pot, had described a circle six inches in diameter. It then slowly swept around to the right side and made another irregular circle, and then returned to the left side of the pot; these movements occupied just twelve hours. The track of the tip of the vine was carefully traced with a pencil upon a sheet of paper laid beneath it, and the entire line of travel measured no less than six feet nine inches.

During the evening the plant became quiet, and probably remained so all night. At ten A. M. the next day, however, it began pointing its tip in various directions, and at noon assumed the form of a corkscrew, about four inches long, which posture it retained until night and then straightened out.

On May 1st the vine was lifted and tied to a vertical support —a large thread—where it remained entirely quiescent for two days. Then it began growing again as if it had recovered from what had been for six days a condition near the point of death.

Another vine was observed carefully during several days of cloudy weather. It uncoiled itself from the stick and reached away toward the light at an angle with the horizon of some forty-five degrees. It was carefully recoiled about its stick, but after it had grown some three inches more it unwound itself and stood away toward the window as before. Time after time during the continuance of the cloudy weather it was brought back to its support, but invariably left it. Then followed a fortnight of bright, sunny weather during which the vine showed no disposition to escape from its stick or stop its twining growth.

Attempts were made to induce another plant to twine in the direction opposite to its normal one, but no ingenuity could deceive the plant as to its proper course. All the experiments seemed to show how much like an animal was the plant in its sensitiveness, not only to changes of light and temperature, but to harsh treatment. Whenever restrained or forced, no matter how tenderly, out of its natural method of growth, all progress was retarded and the health of the vines disturbed in a marked degree. Plants seem to be creatures of feeling and the similarity of movement and of apparent purpose between them and the lower orders of animals are used to strengthen their theory by those who hold to the doctrine of the identity of life in the two kingdoms.

Erie, Pa. *T. D. Ingersoll.*

The Blue Gum Tree.

THE Australian Blue Gum, *Eucalyptus globulus*, has become one of the most prominent and characteristic features in southern California forestry. A tall, slender tree, attaining to an immense height, this native of Van Dieman's Land and Australia has taken firm root upon the Pacific coast.

Many a hillside and plain—a few years ago treeless, parched and brown—has been transformed into a mass of living green, furnishing the refreshment of shade and filling the air with a health-giving, grateful fragrance, through the slight encouragement given to this tree by man. From Eureka to Eusenada—a distance of nearly a thousand miles—this tree has steadily gained in favor. In its native land it grows to a height of three hundred and fifty feet, with a diameter of fifteen feet and more. Already many of the older trees on the coast range are from one hundred to one hundred and fifty feet in height.

A forest of Eucalyptus is something magnificent. Stately in proportions, the trees tower tall and straight above any of our indigenous species in the south, growing so close together as to form an almost impenetrable shade. Altogether it is a spectacle to gladden one's eyes in this "dry and thirsty land." Millions are already planted, and hundreds of thousands are annually planted because of the valuable qualities of the Eucalyptus as a forest-tree. Quick in its growth, it is an unfailing source of supply of fuel and valuable timber in a land where wood and lumber are scarce.

In San Diego County these trees are extensively grown for fuel, but thousands of them are also annually planted for their beauty, as shade or ornamental trees in parks and along avenues, while other thousands are planted as wind-breaks to young orchards, for which use they are well adapted.

The Eucalyptus is easily propagated from the seed, a pound of which may be obtained for five dollars. From this quantity of good seed over three thousand trees can be raised. The first seedlings sold in California, imported from Australia, sold at auction for five dollars apiece. To-day they are worth a cent a plant.

The Eucalyptus thrives on the poorest soil, and once established firmly requires no further care or attention. It seems to do best on the sandy bottoms, but may also be made to do well on the higher mesa lands if once it is able to establish itself, when it will send its roots down a long way where it can get an unfailing water supply. That its culture on cheap lands is exceedingly profitable needs no further demonstration in California. A Eucalyptus-forest may be cut down once in every five (some say three) years to advantage, when new shoots will start from the stumps and a new forest arises from the ruins of the old, and without the first expense of either plowing, cultivating or irrigating, since the roots are already established, vigorous, healthy and uninjured by the fall of the parent trunk.

In the presence of the invigorating fragrance exhaled by this tree, fevers and malaria largely lose their terrors. In California, a dry, pure atmosphere like ours, the valuable quality of this tree, its anti-febrile properties, has naturally been largely lost sight of, as compared with other more important interests. The tree absorbs water with surprising facility, and it is this that is considered by many the basis of its prophylactic properties.

The Blue Gum or Fever-tree was introduced into Paris by the French government in 1860, and was subsequently planted in Africa, Spain, Italy and portions of France, where many large forests have been produced. In 1875 the City Council of Houston, Texas, decided to give the tree a trial in view of the yellow fever epidemics that had periodically filled the city with mourning. During 1875-76 the city was freer than usual from the disease, and in 1877-78, according to the Health Officers' report, was one of the healthiest cities in the Union. As to the subsequent experience of that city I have no data at hand.

The Eucalyptus shows remarkable celerity of growth, having attained a height of sixty feet in eleven years, and in India its growth has been yet more rapid. In Mexico it has succeeded remarkably well at elevations of from 2,500 to 7,000 feet. It has withstood a temperature of nineteen degrees F., but generally succumbs at seventeen degrees F. Frost will kill the young trees.

The timber is used for a great variety of purposes, in shipbuilding, and in all kinds of out-door work. It is about equal in quality to the best English Oak and to the American Ash, and if Californians will have the patience to grow the tree for timber rather than for fuel—as they now do almost exclusively —they might expect yet handsomer returns from its culture than now.

The tree is remarkably free of any disease and of insect pests; moths, mosquitoes, fleas and other insects are said to forsake a room where the leaf branches of the Eucalyptus are freely scattered about.

Notwithstanding there are over one hundred and fifty species of the Eucalyptus, *E. globulus* alone has met with widely extended popular favor in California. Several others like the Red Gum and the Iron-bark seem to thrive equally well with us and are gaining ground.

Thanks to this friendly genus it is only a question of a century or less before the now desert-like plains of southern California can be covered with a growth of gigantic trees.

San Diego, Cal. *C. R. Orcutt.*

Nematodes and the Oat Crop.

THE Oat crop at the time of writing throughout New Jersey gives all the signs of failure. Many farmers have already plowed the fields again for some other crop, while many more are anxious to know what to do. In general appearance the Oat-plant is dwarfed, and nearly all the leaves, especially the lower ones, are brown and dead. As the wheat, rye and grass crops have been badly attacked this spring by the aphis or grain louse, many farmers have ascribed the wretched appearance of the oats to the same enemy, but I am assured by Professor Smith that the aphis cannot be held responsible for a great part of the destruction that is so widespread among the Oats of the state. Therefore it seemed advisable to make a microscopic examination of the diseased plants in order to discover whether the cause of this disaster was not some parasitic fungus. Specimens in root, stem and leaf, from several localities, have been examined, and nothing in the nature of a rust, smut, mildew, mould or blight was found. It may be true that a low form of organism belonging to the group of bacteria is the cause of the unhealthy growth.

Bacteria were found present, but no attempts were made to determine the bacterial origin of the disease.

But small bodies were found within the substance of the smaller roots and these at once suggested undeveloped worms of minute size called nematodes. As the search continued the mature worms were found in full activity.

Readers of GARDEN AND FOREST will remember an article on the Clematis disease, by Professor Comstock, which appeared in the number for January 29th of this year. In this article Professor Comstock showed that these minute worms, which are akin to the well known "vinegar eel," a minute creature often seen wriggling near the surface of vinegar, were the cause of this wide-spread disease of the Clematis. In a note of mine on Professor Comstock's paper, which appeared in the number for February 5th, it was stated that a part at least of the Violet-disease was due to a similar cause, and I mentioned the fact that Dr. Neal, of the Florida Experiment Station, and Professor Atkinson, of the Alabama Station, had each issued large illustrated bulletins which show the ravages of these thread-worms in the Peach and Orange-groves of the south. A species of these nematodes is said to cause the so-called tulip-root in Oats in England.

These worms are very destructive to some of our principal garden crops, and it is evident that a large field is opening in this country for the labors of the economic helminthologist. Unfortunately no cheap method has been discovered which can entirely defeat the attacks of the nematodes. One plan is to cultivate upon an infested area only such crops as are not attacked by these worms, so that they can be starved out, or if the rotation of crops is practiced unsusceptible plants may be used in some part of the rotation. As some weeds, the Pigweed for example, furnish particularly favorable shelter for these microscopic enemies, they should be kept scrupulously subdued by clean culture.

Nematodes may be introduced into a field in composts and barnyard manure, and therefore it is wise, in case of a threatened invasion, to use unslaked lime in thin layers when constructing the compost or manure pile.

It will be noted that the two bulletins spoken of are from the far south. With us in the latitude of New York there is much less occasion for alarm in an ordinary season, for the cold of an average winter is too severe for these worms to withstand. The large numbers of nematodes that have been found upon various crops, such as Spinach and Violets, during the past winter, is probably due to weather unusually favorable to them. A winter warm enough to give us Peach-blossoms during almost every week from December to March was well suited to their rapid multiplication.

Corn is the only member of the Grass family mentioned in the printed lists of hosts for nematodes. The Oat, therefore, is an additional species in that family that is subject to these attacks.

Rutgers College. *Byron D. Halsted.*

New or Little Known Plants.

Trillium sessile, var. Californicum.

THE genus Trillium contains several attractive garden-plants. *Trillium grandiflorum*, the large, white-flowered species of the eastern and northern states, is the most beautiful of them, and when once established in a suitable position it is not excelled in beauty by any spring-flowering herb. The Painted Trillium, as *Trillium erythrocarpum* is called on account of the bright purple-rose colored markings which appear on the lower part of the petals, is hardly less beautiful, although the flowers are considerably smaller and much more modest than those of the better known species which we have referred to above.

Another plant of this genus, of first-rate value as a garden-plant, has been brought into cultivation in recent years. It is the Pacific coast form of a widely distributed eastern species, *Trillium sessile*, found from Pennsylvania and Wisconsin to Florida and Alabama. The western form of this plant, known as variety *Californicum*, is widely distributed through the northern part of California west of the Sierra Nevada and extends into Oregon. The habit of the plant and the character of the flower is represented in our figure on page 321, which is made from a specimen grown in the garden of Gillett & Horsford, of Southwick, Massachusetts, who have obligingly sent it to us for the purpose.

Trillium sessile, var. *Californicum*, is a stout plant with broadly rhombic-ovate leaves varying from three to six inches in length, lanceolate, acute, erect sepals, and oblong or rhombic-obovate petals, which vary in length from one to four inches. These differ in color on different plants from purple to pure white and at first are nearly upright, becoming reflexed above the middle when the flower is fully expanded. The form with pure white petals is the handsomest and most desirable as a garden-plant.

The Pacific coast Trillium, like the other species of the genus, is most satisfactory when it is planted in deep, moist soil in the shade of deciduous trees; that is, where it can enjoy early in the season or during the blooming period full exposure to the light, and where later it can be protected by the leaves of the overhanging trees from the full blaze of the sun. Trilliums should be planted early in the autumn or not later than the first of October if good flowers are expected from them the following spring. They do not show, however, what they are really capable of until they have been allowed to grow undisturbed in the same spot during three or four years and have become well established. Then, if the soil in which they are planted suits them and the situation is a favorable one, they form broad masses of immense leaves and produce flowers of large size and surprising beauty.

Foreign Correspondence.

London Letter.—Pæonies.

AMONG the many beautiful border plants that have sprung into popularity in England in recent years, the Pæonies take foremost rank. Like the Daffodils, they were favorite garden plants in England over three hundred years ago. Gerard said of them in 1580, "All sorts of Pæonies do grow in our London gardens." The revival of a love for these and many other old-fashioned hardy plants may be traced to the development of out-door gardening and especially of the mixed border. Pæonies are essentially border-plants. They are hardy, easy to cultivate, almost any soil agreeing with them; they live to a good age and they flower freely. Their flowers are enormous, often elegant and fragrant, whilst their colors vary from deep purple-crimson to almost white. What could one desire more in a hardy border-plant? In England, Belgium and France nurserymen have done much during the last twenty years to improve the flowers in form and color and also to increase the number of good varieties. A collection of Pæonies is now a feature in all good gardens in June, whereas a few years ago they found admirers chiefly among the cottager. One of the principal raisers and growers of these plants in England, Mr. Kelway, of Langport, admits that he was first impressed with the beauties and capabilities of Pæonies on seeing them worn by the men and women assembled at an Irish wake some thirty years ago. Some of the best of the sorts he has bred from, he obtained from an old woman in his parish. The long lost *P. Whitmanniana*, a yellow flowered species, was rediscovered about eight years ago in an obscure Irish garden. Messrs. Barr & Son, George Paul, Ware and Kelway now possess an immense stock of Pæonies, an indication of their popularity in England. With a view to focusing the Pæony-knowledge and material, the Royal Horticultural Society has this week held a special exhibition of the plants, and papers on their culture, history and classification were read by Mr. George Paul and Mr. Lynch, of the Cambridge Botanic Gardens. The exhibits were marvelous in point of size, color and fragrance in the flowers, Messrs. Kelway staging a splendid array of blooms. Some of the new sorts received certificates. Whilst such beautiful double-flowered kinds as Princess Mary, Sainfoin, James Kelway and Lady L. Brumwell were greatly admired, the single flowered varieties received much attention. Some of them were remarkable for great substance of petal, far in advance of the older kinds, in which flimsiness of flower was a drawback. A deep blood-crimson kind named Stanley, a pink and white called Dorothy Tennant, and Julia Kelway, a blush white, were amongst the most notable of the single flowered sorts.

Tree Pæonies were not well represented, most of them being past flower here. The behavior of the Tree or Moutan Pæony in English gardens is not always satisfactory. In some situations the plants die a foot for every six inches they grow; in others they grow well for a time, and then go off suddenly, apparently attacked by some fungoid disease; whilst in some

gardens one may see immense bushes of them, eight feet in diameter, and bearing hundreds of huge blooms, each as large as a moderate-sized cabbage. Where they thrive these Tree Pæonies have few equals among early summer flowering hardy shrubs.

The Belgian and French nurserymen are the chief growers and raisers of Moutan Pæonies; Messrs. Makoy & Co., of Liege, and M. Dessart, Chenomceaux, Indre et Loire, having

Fig. 44.—Trillium sessile, var. Californicum.—See page 320.

exceptionally rich collections. The species was introduced from China to Kew by Sir Joseph Banks in 1787. Many varieties have since been obtained from the same source. The great range of variation in size, form and color, and even in leaf characters, is remarkable in this species.

I believe it is the almost universal custom to graft *P. Moutan* on the roots of the herbaceous kinds, and in trying to account for the bad behavior of the Tree Pæony at Kew I have half suspected that the cause lay in this very fact. That there is not any close affinity between the tree and the herbaceous species is evident from their refusing to cross with each other, whilst there ought to be good physiological reasons against grafting a decidedly woody shrub on the roots of a plant of very succulent and herbaceous character. The right method, one would think, would be to use seedlings of *P. Moutan* as stocks. Herr Max Leichtlin, who has raised one of the finest seedlings in Ceres, states that the seeds take about fifteen months to germinate, and the plants are from five to seven years old before they flower. Amongst the varieties grown at Kew the richest in color is that called Gloria Belgarum. The flowers are full double, a foot in diameter, and rich rosy red. These plants require a deep, rich, loamy, rather moist, soil, and a position shaded from very bright sunshine. In England they rush into growth so early

in the spring that a little protection must be given in frosty weather. When at rest frost does not injure them; indeed Fortune, who introduced many varieties into England, declared that a severe winter was conducive to their health.

The history of the herbaceous species, as represented in English gardens, was treated at some length by Mr. Paul. Almost all of the several hundred named kinds catalogued to-day are the progeny of *P. albiflora* and *P. officinalis*, a few only being from *P. peregrina*, and two or three from *P. tenuifolia*. Mr. Baker, in his monograph of the genus published in the *Gardeners' Chronicle* in 1884, admits only twenty-two species. They are distributed over Europe, temperate Asia, China and America. In the last-named country, *P. Brownii* is the only species that occurs wild. It extends from California to the Rocky Mountains. In 1884, and, so far as I know, even now, this species was not in cultivation in England. A hundred years ago *P. officinalis* and *P. grandiflora* were the only species recorded as being in cultivation in England. Mr. Paul says that the attention of the florist was not devoted to the herbaceous Pæony until about 1840, when Parker, Salter and Loddiges began to collect and cross them. In 1855 there were twenty-four double-flowered varieties, nine of which still survive in English collections. Lemoine commenced as early as 1824, whilst in 1840 the Prince Salm Dyck had a good collection of sorts in his then famous garden near Paris.

The cultivation of the herbaceous species was, Mr. Paul said, ridiculously easy. The richer the soil the better, of course, will be the results, for Pæonies are gross feeders. Mr. Wilkes, the Secretary of the Society, who showed a fine collection of flowers, stated that he emptied the cess-pools of his pig-sties upon his Pæony-clumps. They like plenty of moisture at all times. In shade, as well as in the open, they grow quite freely. Some of the growers of flowers for the London markets plant Pæonies under their orchard trees exactly as they do Gooseberries and Rhubarb; in this way they get a plentiful crop of flowers, which sell for about half a dollar a dozen. The most favorable time for transplanting is from November to February. Mr. Paul advised starting with small crowns in preference to large clumps, which rarely transplant satisfactorily. The third year after planting ought to see abundance of flower. The seeds take about a year to germinate, and the plants flower when four years old.

London. *W. Watson.*

Cultural Department.

Notes on Shrubs.

THE earliest species of Lilac in cultivation to bloom is *Syringa oblata*, while one of the latest is the large tree-like *S. Japonica*. The interval between these two extremes is from five to six weeks. As a sequence of flowering Lilacs is sometimes a desideratum the following data may give an approximate idea of the times of blossoming of the different species when growing under the same conditions. *Syringa oblata*, of which a figure from a photograph appeared in the first volume of Garden and Forest (p. 221), blossoms in this climate about the middle of May, varying with the rest of vegetation in being a little earlier or later according to season, situation and exposure. The bright lilac flowers of this species do not differ greatly from some of the forms of the common Lilac, and are no better, although the flowers of *S. oblata* have a peculiar character hard to describe, but which enables any one familiar with both to separate them easily. The thick, leathery, rounded, heart-shaped leaves are also so distinct as not to be easily mistaken. It has been claimed that these are not attacked by the mildew which often seriously injures some other kinds, but, in some localities at least, the foliage of this species is by no means exempt from the disease.

A week or more after *S. oblata* begins to blossom the first flowers appear on the earliest garden varieties of the common Lilac (*S. vulgaris*). One of the most precocious of these is the old double flowered, small panicled variety known in catalogues under the name of *Syringa vulgaris, flore pleno*. It is closely followed, however, by the numerous other forms originating from the same stock, or by the hybrids with other species, which are likely to be greatly multiplied and give rise to forms as early as *S. oblata*. Out of the hundreds of the so-called varieties of *S. vulgaris* now offered for sale, a selection of a dozen might be made which would practically include all of much value. A large number are being tested side by side at the Arboretum with a view to comparing the distinctive merits of their blossoms. For the amateur who has only space in his garden for one or two plants of this type there are few which can give more satisfaction than the old Charles the Tenth as a dark red, and Marie Lagrange as a large flowered and large panicled pure white one. Both of these seem slightly later in flowering than the average of the forms and it is noticeable that the flowers maintain a fresh looking appearance for the longest time.

When the forms of *S. vulgaris* are grafted upon stock of the common Privet (*Ligustrum vulgare*) they make much more dwarf and compact plants and bloom sooner than when grafted on stock of their own species. The two Lilacs known as *Syringa Persica* and *S. Chinensis* blossom at the same time as *S. vulgaris*, and the flowers last as long as those of the best forms of the most common species. These plants are becoming even more common in some old gardens than *S. vulgaris;* and, on account of smaller size and more slender, graceful habit and the particularly large, thick clusters of flowers which they bear, they are too valuable to be omitted from the amateur's garden. There are forms of both with flowers varying in color from dark purplish red to white.

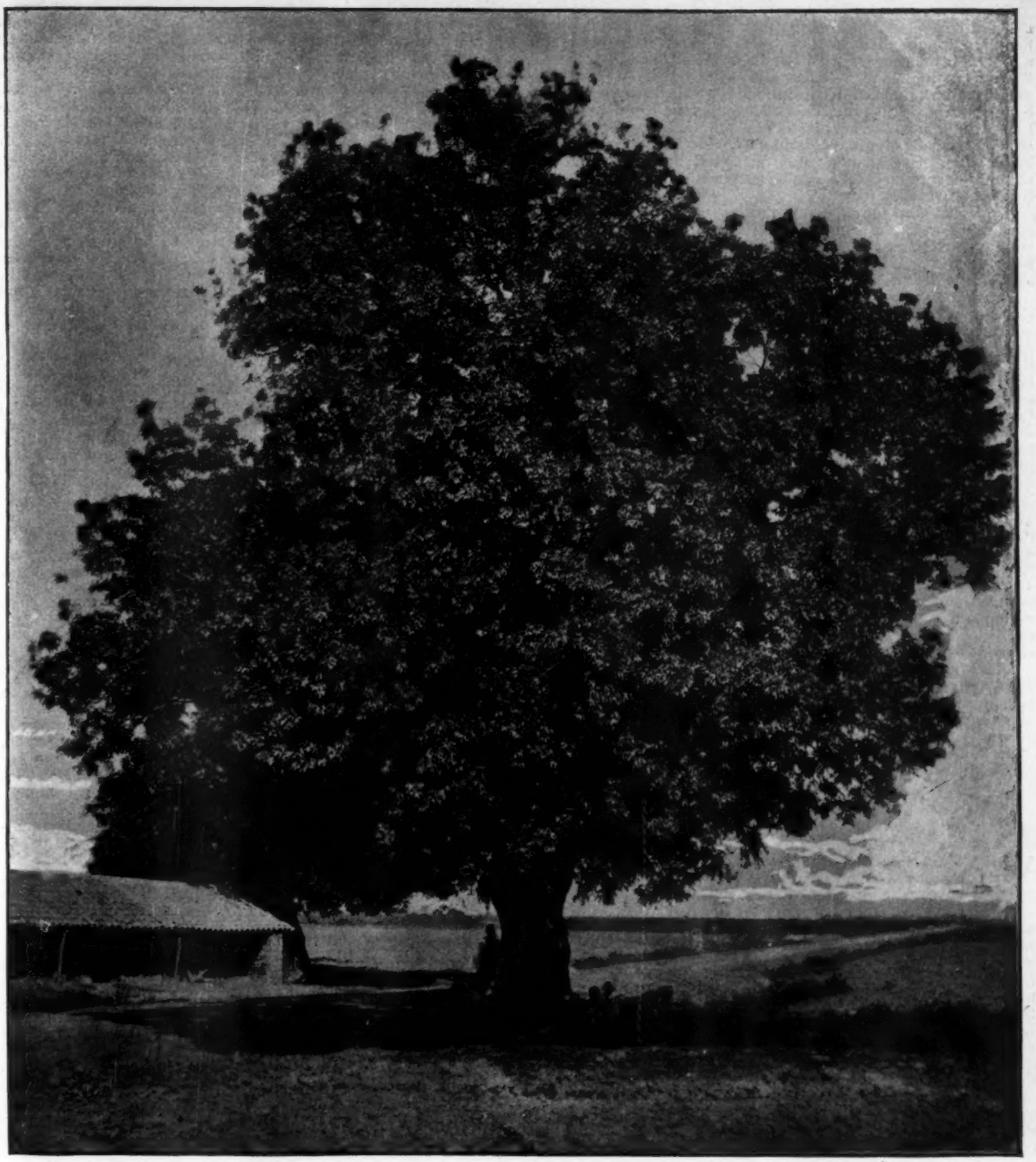
Syringa pubescens as it grows at the Arboretum has rather small panicles of pretty, pale lilac flowers, which appear with those of the preceding species. It is of rather straggling habit and does not present any marked peculiarities which would make it of special value to the horticulturist or florist. It is not until the last flowers of all these species and varieties have disappeared or are fading that the blossoms begin to expand upon the Asiatic *S. villosa*, and upon *S. Josikæa*, which is supposed by some botanists to be a variety of it. The inflorescence, however, is so strikingly different that it seems quite probable that they may yet be proved to be distinct species.

The first flowers of *S. villosa* generally appear at the end of the first week of June. The buds and outside of the corollas are of a rose or lilac color, but when expanded the open flower is very pale lilac or almost white. They are produced in broad, heavy clusters on rigidly upright branches, the whole plant having a coarse and stiff aspect. A figure of a flowering branch has been given in Garden and Forest, vol. i., p. 521. The flowers possess a good deal of odor, but it is less agreeable, though less intense, than that of the common Lilac.

Syringa Josikæa is not known in a wild state, and has all been propagated from a single plant found in a Hungarian garden. The slender, tubular, dark purplish flowers are produced in much smaller panicles than those of *S. villosa;* and as the plant does not appear to bloom so profusely as most of its congeners it is of less value for ornament. But on account of its lateness and the peculiar color of its blossoms it is not likely to be neglected or left out of any collection. These two species continue to maintain some fresh looking flowers for about a fortnight, and it is not until the last of them are fading that the blossoms appear on those species belonging to that section of the genus which have white flowers and very short tubular corollas. The two or three kinds in cultivation are all of quite recent introduction, and are as yet very little known outside of botanical gardens. The finest and most desirable of these is *S. Japonica*, which was described by Professor Sargent and figured from photographs in Garden and Forest, vol. ii., pages 293 and 295. The plants raised from seed appear variable in their time of flowering, a difference of a week being noticeable in specimens growing under very similar conditions in different gardens. Last season was an unusually early one, and the plant which was figured in Garden and Forest was in full flower about June 15th, but this year it did not reach the same stage of development until about June 24th. This plant is one of the earliest; others at this date (June 24th) hardly have the first flowers open. The small white flowers have a slightly creamy tinge of color, and in odor as well as general appearance they are more like gigantic panicles of the flowers of the common Privet than those of a Lilac. If it should be found possible to hybridize this splendid tree-like species with any of the Lilacs of our gardens some remarkable productions may be expected. The best plant at the Arboretum is now twenty feet high, with a clean trunk sixteen inches in circumference at four feet from the ground.

Syringa Amurensis has much of the appearance of *S. Japonica*, but so far seems to be inferior to it. A plant sold under the name of *S. Sibirica* seems to be the same as this. *S. Pekinensis* is flowering freely at the Arboretum this season. The flowers are smaller and a little purer white than those of *S. Japonica*, and the panicles are not quite so large. The whole aspect of the plant is strikingly different on account of its smaller leaves and much more straggling or spreading habit. The largest plant has now exceeded the stature noted by Abbé David when collecting about Pekin, who described this species as a shrub three metres (about ten feet) in height, and the white flowers exhaling an odor of honey.

Arnold Arboretum. *J. G. J.*



The Carob-tree (Ceratonia Siliqua).—See page 318.

Notes on American Plants.

THE *Malvaceæ* or Mallow Family constitute an interesting class of plants, represented in North America by nearly one hundred and fifty species and varieties composed of herbs and shrubs. Many of these are already in cultivation, but there are still others that are destined to hold good positions among our garden flora. One of these, which we believe is not yet generally known, at least to American growers, is the Maple Leaved Sphæralcea—*Sphæralcea acerifolia*. It is found in the basin of the Columbia River and its tributaries, also in portions of Nevada and Utah, at from 6,000 to 8,000 feet in altitude. Its usual height is about four feet, yet in favorable situations it is sometimes six feet high. It is a herbaceous perennial. The numerous stout stems terminate in clustered racemes, almost a foot in length, of pale purple flowers which are from half an inch to an inch and a half wide, and very pretty. Below these racemes are numerous large, cordate, five or more lobed leaves, shaped like those of the Maple, from which the plant takes its name. Its time of flowering is from June until September. It is hardy, easy of culture and should be grown in the sun.

Baptisia leucantha, one of the False Indigos and a member of the Pulse Family, grows from two to three feet high, bearing an erect, long, loose raceme of white flowers. It is a taller plant with less divergent branches than *B. leucophæa* mentioned in a previous paper. The foliage is not abundant. It is found in alluvial soil from Ohio to Wisconsin and southward. It needs a light soil and full sunshine.

Calochortus longibarbatus, from Oregon and Washington, is a desirable species for this climate, as the plants show more health and vigor than most of this class here. It grows about a foot high, bearing from one to three, usually two, pale purple flowers an inch and a half wide. Across the base of each petal is a dark purple stripe which gives the flower additional beauty. Above this, on the inside, the petals have numerous long, white, hair-like beards almost an inch long. The leaf, which is usually single, is about eight inches long by half an inch wide. Our plants were protected during winter. It should be set in a light soil and exposed to sunlight in September or October.

Allium hæmatochiton, from southern California, is a small species six or eight inches high, bearing an umbel of six to twelve small white flowers with greenish stripes and a reddish brown centre. It is a tender plant and should be wintered in sand in the cellar.

Tigridia buccifera, which was first figured and described in GARDEN AND FOREST (vol. ii., p. 412, Fig. 123), is quite abundant in portions of southern Texas. This we believe is the only species yet reported within our borders. It is one of the earliest if not the very first to flowers. In a light, loamy soil it is not so large as in a clay loam, yet it seems to do fairly well in any ordinary situation and is much larger after being cultivated than when first taken from its natural home. Although its individual flowers are of very short life, they are borne in such long succession that a bed of them will be almost continually in bloom from the middle of June until early autumn.

One of the most common of the *Rubiaceæ* or Madder Family is the little Partridge Berry (*Mitchella repens*). This charming little evergreen at this season is covered with its pairs of small fragrant white flowers, a third of an inch wide. Later in autumn the pretty scarlet berries add much to its beauty, as they offer a pleasing contrast with the thick, dark green foliage. These remain on all winter, and both leaves and fruit are as attractive in spring as at any season. The foliage is often variegated with lighter lines. It does well in a fine loamy soil, where it soon forms dense mats of its prostrate, creeping stems.

Lilium Parryi, from southern California and Arizona, is a good native species, not difficult to grow in a moist, loamy soil, and bears one to several large, handsome yellow flowers, in shape not very unlike our common Meadow Lily. The flower is fragrant, durable and quite distinct in color from other yellow-flowered varieties. It is a healthy growing plant, hardy, if planted deep, and is sure to be a favorite when better known.

Southwick, Mass. *F. H. Horsford.*

An Indispensable Greenhouse.

WHO loves a garden loves a greenhouse, too, but few love a greenhouse when they can enjoy the pleasures of a garden, with all its varying scenes from spring until winter, and then a greenhouse is a luxury to some, and to others a necessity. Of course greenhouses differ greatly among themselves. To persons of limited means the greenhouse is often a combination of a stove-house, Rose-house, Palm-house, Orchid-house, and a place for keeping bedding plants for summer flower-beds. Besides these there are succulents, subtropical plants, aquatics, which must be taken up and housed just as the Queen of Autumn holds levee, and space must be afforded for a few of the choice Chrysanthemums which cannot endure freezing temperature. Then Primulas, Cinerarias, Calceolarias, Cyclamen and a host of winter-flowering plants must be crowded in because flowers are looked for from a gardener "who has glass." I pity a man who has such a charge. It is impossible to keep or grow tropical plants in a cool house or to grow alpine plants in a stove-house. To be successful with most plants that are now to be found grown in glass structures there must be at least three houses of different temperatures, called in gardeners' language the stove-house, greenhouse and cool or cold house. The minimum temperature of the stove-house is sixty degrees; the greenhouse, fifty degrees; the cool house, forty degrees.

The cool house I consider a necessary adjunct to the greenhouse, and if only one can be built this is the indispensable structure. The style of the house is not the most important matter. A span roof undoubtedly will give the most light, which is an important point in the construction of a greenhouse, but the roof and sides are exposed to the full action of the weather. And this will tell in winter upon the coal bill. All things considered, I prefer a span roof house; the next best house would be a three-quarter span, such as those built principally for Rose-growing. This is a very useful and economical house. Its aspect should be due south if circumstances permit, making it a very light house in winter; and it should be protected on the north side by a wall. A lean-to is better than none at all, and can be attached to another building if suitably located; but such a house is not best adapted for plant growing. A very convenient house is a span-roof eleven feet wide, fifty feet long, four feet sides and seven feet six inches high in the centre. This will allow a three-foot six-inch bench or table on each side and a walk two feet six inches through the centre. Such a house requires only ventilators on either side of the ridge. Two-foot sash is preferable the whole length on each side, and a flow and return pipe three and a half inches in diameter will answer for heating. In such a house Carnations and Mignonette will flower all winter; Stocks and Wallflowers will furnish early bloom; Cinerarias and Calceolarias are quite at home; Verbenas, Petunias and many bedding plants can be safely housed; Echeverias and other succulents and dry roots will keep well under the benches, and it is just the place for Chrysanthemums from the time they leave the cutting bench until they are planted out.

Staten Island, N. Y. *W. Tricker.*

Orchid Notes.

Phajus Humblotii.—When this beautiful species was first introduced and described by the collector as a rose-colored Phajus it caused a sensation among Orchid-growers. It is named in honor of its discoverer, M. Leon Humblot, who brought the plants to Europe some nine years ago. Very few arrived alive, and consequently large prices were realized for them. Several years elapsed before any attempts were made to reintroduce it, and the plant became almost extinct. Some twelve months ago an importation was received by F. Sander & Co., St. Albans, and it is now so widely distributed that few collections of Orchids are seen without it. It fortunately proves an easy plant to grow, it flowers abundantly and occupies little space. In habit it is both dwarf and compact, having robust rich green foliage, and produces a spike one and a half to two feet high, on which are borne twelve to eighteen bold and attractive blossoms, arranged in such a manner that each may be seen to advantage. They measure individually two and a half inches across; the sepals and petals are broad and suffused with a rich rose color; the lip is broad, the upper portion furnished on either side with reddish crimson; the crest is very prominent and of a fine bright yellow. While growth is being made, which is during the summer months, this plant requires a temperature of sixty-five to seventy degrees, with a position near the glass, but precautions should be taken that it does not receive direct sunlight. Ventilation is also highly beneficial, and when growth is fully completed water should be sparingly given, or growth will again commence before the flower-spike develops, which is immediately after the growth is made. This Phajus enjoys a compost of turfy loam, coarse sand and fine peat, with a portion of chopped sphagnum. There is a well-grown plant of this species in the collection of Mr. F. L. Ames, North Easton, Massachusetts, and when in bloom a short time since it was a strikingly beautiful object.

Phajus Henryii.—This is also a valuable acquisition, introduced by M. L. Humblot together with the plant above described. Few plants, however, were received, and they were afterward rarely seen in a thriving condition. A considerable number of plants were sent to Europe last year, together with the other Phajus, and they arrived in excellent condition, and the plant is now often seen growing luxuriantly. The blossoms of *P. Henryii* are paler in color than those of *P. Humblotii*, the lip especially being much lighter, the upper portion marked with brownish crimson and finely fringed. A plant is now in bloom in Mr. H. Arnold's collection at Eighty-fourth Street. The spike is erect and two feet in length, and carries seventeen blossoms, which greatly resemble those of *P. Humblotii* in shape. It is a charming species, and is admired by all who have seen it.

Summit, N. J. *A. Dimmock.*

Papaver bracteatum roseum or Blush Queen is a variety which is said to have originated in an English private garden and has lately been distributed. It resembles the type in foliage and habit, but the flowers are quite unique, being pale blush pink, shading to deep red satin blotches at base of petal. In color effect it is something like the flowers of the Rose of Sharon (*Hibiscus Syriacus*), though brighter. It is a charming flower, though quite inconspicuous in comparison with the scarlet perennial Poppies, which are among the most vivid of flowers, though among a lot of seedlings there will usually be found some variation from bright orange-scarlet to blood red. The new variety seems to be the first decided break from

intense reds and leads one to hope for a pure white form—which would be a grand plant.

Scabiosa Caucasica is one of the choicest of hardy plants, and indispensable in any garden. The plants are dwarf, and the flowers, thrown well above the foliage on long stems, of a light lavender color and some three inches in diameter, are as pleasing as useful for cutting. Stock of this plant may be readily had from seed. The plants require a deeply worked soil, and if necessary to shift, it should be done with great care, as the roots extend deeply even in a young state. It seems reliably hardy in all stations in this latitude.

Silene inflata, the Bladder Campion of Britain, seems to have become naturalized in some of the eastern states, which is scarcely a matter of wonder, as some bits sent me have proved very prolific and vigorous and well able to hold their own among ordinary plants. This is an attractive plant with white flowers, globular capsules and graceful habit.

Elizabeth, N. J. *G.*

A beautiful Rose in Mr. Waterer's nursery at Knaphill is the result of a cross between *Rosa rugosa* and a Hybrid Perpetual variety. It is not an exhibition flower, nor perhaps one that show-flower fanciers would care for; but the blooms are of an intense crimson color and as sweetly scented as the old Cabbage Rose, while the plant is free both in growth and bloom. This is the kind of Rose that many would admire, although it may show a little of its yellow centre, not only for its color, but sweet scent. A scentless Rose is without its greatest charm.

The Garden.

Color in the Borders.—Natural and easy combinations of color in the herbaceous borders are rare. They should not be difficult to obtain, although more forethought and time are required to produce them than in regular bedding arrangements. As the use of hardy plants for supplementing this expensive and unnatural style of gardening is in its infancy, we may, and shall, expect much improvement in the direction of proper arrangement of color. To show where experience leads, I can give a case where German Irises were planted indiscriminately among Ghent Azaleas. It was found advisable to remove all bronze and yellow-flowered varieties, as they marred rather than increased the effect intended by planting them. Another accidental case struck me as being to the point. A white and a pink variety of *Phlox decussata* had been planted near together, so that about a dozen stems of *Campanula glomerata* (blue-purple) from a neighboring clump fell closely amongst them; these together made a pleasing combination. For experiment I tried placing a few heads of *Lychnis Chalcedonica* (scarlet) with a view to effect, and also *Coreopsis lanceolata* (yellow). The combination, I thought, did not need either, and looked worse when both were added than with one only. Tall Delphiniums (blue) and *Thermopsis Caroliniana* (yellow) go very well together.

Wellesley, Mass. *T. D. H.*

Correspondence.

The Study of Botany.

To the Editor of GARDEN AND FOREST:

Sir.—The recent articles in your journal with regard to the development of the powers of observation and the consequent increase of pleasure which spring from even a rudimentary knowledge of botany, have made me notice with especial interest certain passages in that delightful book of Richard Jefferies' called "The Open Air." Jefferies was one of the closest observers of Nature who has ever lived and written, yet throughout his life he prided himself on being a *dilettante*. I do not know that he would have used this word, but it is the one that fits the case. Nevertheless he was born to be something better. His dislike for the scientific student seems to have been as great, theoretically, as his scorn for the artist. Yet on every page he proves himself an artist born—one who noticed every faintest shade of color, effect of light and subtlety of form, and described them in words the full significance of which only an artist or a keen student of art can fully appreciate. And, on the other hand, he shows very often a yearning for that exact information which only scientific study could have supplied. In consequence of his neglect of both art and science, he was always a discontented lover of Nature. Finding no outlet for his passion, no purpose in his observing, he was continually questioning why beauty existed, what it implied, and how it was as beneficial as he felt it must be. In the essay called "Wild Flowers" we find singularly contradictory passages. For instance, he says, "The first conscious thought about wild flowers was to find out their names—the first conscious pleasure—and then I began to see many that I had not previously noticed. Once you wish to identify them there is nothing escapes, down to the little white Chickweed of the path and the moss of the wall. . . . Plants everywhere, hiding behind every tree, under the leaves, in the shady places, beside the dry furrows of the field; they are only just behind something, hidden openly. The instant you look for them they multiply a hundredfold." Does not this suggest a mood which would have turned instinctively to botanical study and to books for easily won information? But no; Jefferies confesses how hard it is to discover common names from common people; he carries books with colored pictures around with him and mourns over their insufficiency and inaccuracy; he would like a botanist at hand to tell him what this thing is and that; but further than this in the path of inquiry he will not go. "If," he says, "some one tells you a plant, you know it at once and never forget it, but to learn it from a book is another matter; it does not at once take root in the mind, it has to be seen several times before you are satisfied—you waver in your convictions." Could anything be more singular as expressing the feelings of a cultivated man? It is as though he thought books were something apart from men—were not to be trusted, while the speaking voice might be. And does it not show that, after all, his interest in Nature was chiefly artistic—was concerned with beauty simply, not at all with facts? Otherwise he would have been impressed by that tracing of relationships between one plant and another which the printed page makes clear as spoken words very seldom can, and would have found his interest immeasurably increased by the ramifying facts thus made plain. It is, indeed, a curious study in psychology that Jefferies' book presents. A careless reader may be deluded by it into thinking that, since Jefferies could enjoy so well and describe so exquisitely, ignorance must be a blessing. But a more careful eye will trace on every page the record of a mutilation of pleasure, a limiting of intelligence, a missing of golden opportunities for which his ignorance of elementary scientific knowledge was alone responsible. He has given us a delightful series of books about Nature; had he studied a little botany they would have been twice as delightful to us, and he would have got thrice the delight he did from their making. He was always in some puzzle that he could not read, and the naïve confession of the fact makes his essays often truly pathetic. Others, however, may profit by his example. The best of his words for them to remember are: "Once you wish to identify them there is nothing escapes;" and to these I venture to add on my own account, They can be perfectly identified only by a study of botany, and there is no study so easy (as far as the mere nature-lover needs to pursue it) or so pleasurable in itself. For few indeed must be the people in this time and land who share Jefferies' prejudice against books or his greater confidence in the spoken word of some chance companion.

New York City. *George Cumming.*

Anthracnose on the Maple.

To the Editor of GARDEN AND FOREST:

Sir.—Since the appearance of the note on the Anthracnose on the Oaks upon page 295 of GARDEN AND FOREST, many affected Oak-leaves have been sent to me from various parts of the country. Those from Salem County, Massachusetts, were unusually bad, and Mr. John Robinson, a keen student of dendrology, informs me that Buttonwoods never look well there, the leaves drying up in spring as if killed by frost. The purpose of this note, however, is to say that the same blight of the Sycamore and the Oak, *Gliosporium nervisequum*, attacks the Maple. A large White Oak tree about a mile from New Brunswick is badly infested with this leaf blight. Standing close to this tree is a Swamp or Red Maple (*Acer rubrum*), many of the leaves of which were brown and wrinkled in patches. These portions are found to be attacked by the same blight and present the peculiar characteristic of forming the spore patches along the leaf nerves as indicated in the specific name of the fungus. The leaves of the Maple upon branches interlocking with those of the deceased Oak were noticeably the most distorted. This makes three distinct groups of forest-trees susceptible to attack from the same Anthracnose.

Rutgers College. *Byron D. Halsted.*

The Blight of the Sycamore.

To the Editor of GARDEN AND FOREST:

Sir.—In your issue of last week you ask for notes of the Sycamore disease, *Gliosporium nervisequum*. It has been known here for the past twenty years, and those who have been here that long say, "worse this year than ever." It is common at Bloomington, in the central part of the state; at

Rockford in the northern part; and at Hamilton on the Mississippi, across from the north-east corner of Iowa. Professor F. J. Burrill, in making a journey to St. Louis this spring, noted it all along the road nearly to East St. Louis. The trees in St. Louis were all in perfect health.

Professor Bailey, in the "Horticulturists' Rule-book," speaks of it as attacking the leaves in spring. That is hardly correct, since the damage has been completed or nearly completed the preceding year. The disease attacks the twigs of the current year's growth, nearly girdling them, but leaving them so that the buds can put out and make some growth before they are cut off entirely.

We have something else that is attracting our attention just now. A week ago brown spots were noticed on a hedge of Norway Spruce. On examination it proved to be the work of a spider, probably the same as the red spider of the greenhouse. Since then it has been making its presence known very rapidly. Whole trees here and there are beginning to take on a sickly look. It is hard to predict what may happen as the result of a hot, dry spell of weather such as we are likely to have at this season, but the Norway Spruce would certainly suffer seriously.

Agricultural Experiment Station, Champaign, Ill. *G. W. McCluer.*

The Chrysanthemum Fly.

To the Editor of Garden and Forest:

Sir.—In the autumn of 1888 Mr. W. Rowe, of this city, selected the Chrysanthemum Mrs. F. Thompson as a seed-bearing plant, and placed it in a greenhouse with a number of varieties, mostly single, but exceedingly rich in color. The seed plant, which had only nine flowers, matured a considerable quantity of seed, which in due time was sown, and from which ninety plants were obtained. Out of this lot eighty-one flowered last fall, and at least one out of every four would be worthy of a place in any good collection.

Only one of these seedlings resembles the seed parent in a marked degree, but in form, color and size many of them partake of the characteristics of other varieties growing in the house, making it probable that some agent had carried to the seed-plant pollen of greater potency than its own.

This agent is a fly resembling somewhat the honey bee. It was most abundant in the fall of 1888, and is an industrious little creature, taking its daily rounds among the flowers in search of food. Being interested in it as a co-worker, and desirous to know more of its ways, a specimen was mailed to a friend, who sends the following note:

"The little yellow fly you send is probably *Meredon bardus*, Soy. Its larva is aquatic, and may live in the water tanks about greenhouses. It seems to be fond of the honey of flowers, and is frequently an inhabitant of greenhouses all winter. I give it credit of doing good work for me in crossing Chrysanthemums, consequently I rather encourage its visits.

"This fly is easily tamed, and three years ago I had two in my greenhouse that were so tame that they would come at my call and eat honey from my hand."

New Haven. *A. Veitch.*

This matter of the Chrysanthemum Fly was brought to my attention last fall by Dr. John Hamilton, of Allegheny, Pennsylvania, who sent me a specimen for determination. He stated that certain growers of seed had bred this fly, and that the secret of their success was in the fact that by the aid of this insect they secured the most perfect cross-fertilization. The fly was a very familiar one to me, a supposed importation from Europe not more than twenty years ago, but one which has since spread all over the United States. In England it is well known as the "Drone fly," and its technical name is *Eristalis tenax*, Linn. In its early stages it is one of the "rat-tailed" larvæ, so commonly found in the filthiest excrement. The pupal stage is passed just underground, and the mature fly, strongly resembling in size and appearance a honey bee, is very fond of flowers, presenting the most complete change in habit and taste between the larval and imaginal stages. I have commonly found the fly in September on sunny fences everywhere, more especially near outhouses or barns. The secret of their presence in greenhouses is probably found in the presence of manure and compost heaps, which furnish the best breeding places for the larvæ, while the Chrysanthemums, by far the most gorgeous and prominent flowers at that time, attract the fly. There seems to be little doubt of the fact that the fly is an efficient agent in fertilizing these flowers, but whether it is so exclusive as to merit the term "Chrysanthemum Fly" is quite another question. Dr. Hamilton assures me that seedsmen cultivate this fly and are very averse to give any information concerning it. The breeding is easily accomplished. The flies are everywhere, and a little encouragement in the shape of a filthy and rather shallow manure pit will provide for a full crop without further care. The *Merodon barda* (now *Mallota posticata*, Fabr.) bears a casual resemblance to *Eristalis tenax*, and the latter may have been mistaken for it. The larval habits are similar, and it is not without the bounds of possibility that there are two "Chrysanthemum Flies." *M. posticata*, however, is given a June period by Dr. Williston, who took it on blossoms of Dogwood and Blackberry. As to the distribution, *E. tenax* is recorded from Europe, Asia, Africa, North America and Japan. *John B. Smith.*

A Hardy Plant Nursery.

To the Editor of Garden and Forest:

Sir.—A nursery of hardy plants is rarely more attractive than during the early summer, and any one interested in such plants will be repaid by a visit at this time to any of the establishments where they are largely grown, for a personal inspection will give one a better idea of their value than pages of description. When one is forming a permanent plantation or garden it is desirable to see the various plants well grown and in bloom when possible, as tastes differ materially, and in color especially one's own eyes are the best judges of what is satisfactory.

At the nursery of Mr. H. Meyers, Passaic, New Jersey, I found a few days ago many interesting plants. The Kæmpfer's Iris, partially in flower, made a display of unique bloom. To Mr. Thomas Hogg's first importation of this valuable flower have been added many more of varying merit, so that the collection of varieties here is quite complete. The large, beautiful, flat flowers, poised so gracefully over the reed-like foliage, have a remarkable variation over a somewhat limited range of colors—wine-reds, violet, purple and white. The flowering of *I. lævigata* practically closes the Iris season of the better known kinds. As seen in nursery rows the plants are not as attractive as when planted near water, but one notices sharp contrasts between the plants as to height and time of flowering.

Among other interesting plants in bloom were *Lilium Grayi* (Garden and Forest, vol. i., 19, Fig. 4), *L. Hansoni*, *L. Chalcedonicum;* Campanulas in great variety; Delphiniums in almost endless species and hybrids, the latter the gayest, though *D. formosum* will probably ever remain the favorite Larkspur. *Platycodon Mariesi*, the new dwarf species, is an interesting plant with large flowers. Its height of eight to twelve inches seems no great advantage, as the old *P. grandiflorum* and its white variety owe somewhat of their grace to their not too long stems. *Aquilegia Canadensis*, var. *flaviflora*, is a curious, though not showy, dwarf variety, with pale yellow flowers. *A. chrysantha* covered great breadths, but their brightness was somewhat dimmed by the yellow composites near. A mass of *Lychnis coronaria* (Mullein Pink), with silvery, woolly foliage and bright magenta flowers, contained also a few sports showing white flowers, with rose-colored pencilings. *L. chalcedonica* and the double variety, as also the white, and *L. Haageana* also represented this favorite flower in bloom. The latter variety, when it does well, is one of the most satisfactory of the family, its colors ranging from faint rose to brightest scarlet, being perfectly clear and distinct.

Two grand plants for sub-tropical gardens were noted; *Senecio Japonicus*, a large yellow composite, with deeply cut palmate leaves, and *Telekia spinosissima*, a wild-garden plant, with Inula-like yellow flowers, and broad, though somewhat coarse, foliage.

Other interesting flowers were *Salvia hians*, a fine blue, dwarfer than *S. patens; S. pratensis; Spiræa bullata*, the dwarf species with deep green foliage and dark rosy flowers, beautiful for edgings; *S. filipendula*, and its double variety; Potentillas in great variety; *Centaurea nigra variegata*, with excellent variegation and red thistle-like flowers; Perennial Peas, the white-flowered variety being one of the most useful and attractive of low vines; Geums, Alliums, Phloxes, Achilleas, those with silvery leaves the best; Coreopses; the graceful Bowman's-root (*Gillenia trifoliata*), and scores besides which might be named if a mere catalogue had general interest.

I must be allowed to mention, however, the curious Mosquito-plant (*Vincetoxicum acuminatum*) from Japan, which might be useful in some places. This is an Asclepidaceous plant with clusters of small white flowers which secrete a viscid juice. They are attractive to mosquitos, which are entrapped as they alight on them. At the foot of the hill just within the shade of the Beeches a colony of *Cypripedium spectabile*, finely in bloom, well repaid one for a journey.

New York. G.

Periodical Literature.

The June issue of the Kew *Bulletin of Miscellaneous Information* is devoted to articles on compressed or tablet tea, which is manufactured at Hankow from tea-dust, and is now consumed in immense quantities in Russian Siberia. It appears that the volume of the brick tea trade is rapidly increasing and that the demand is becoming greater than the supply. To meet this, steam machinery has been introduced for the purpose of pressing the bricks, with the result that the steam-made article is more compact, better finished, and better able to withstand the long, rough journey it is obliged to make before reaching the consumers in Siberia. The following account of this interesting product is extracted from the report of the Commissioner of Customs at Hankow:

"The first operation is to sift the dust and reject all the sand and rubbish contained in it, usually amounting to about five per cent. It is then placed in a winnowing machine having three different sized sieves, with troughs corresponding, and passed into baskets. The residue, which is too coarse to pass any of the sieves, is taken out and trodden until it is reduced to the proper consistency, when it is placed in iron pans over a charcoal fire until it is sufficiently brittle, when it is again taken to be winnowed, and this operation is repeated until it has all been sifted to the requisite degree of fineness. Three sizes are produced, the coarser ones being employed to constitute the brick, while the finest dust is only used as a facing. The dust having been properly sifted, the next step is to prepare it for pressing, and this is done by exposing it to the action of steam for three minutes, and it is this steaming that robs brick tea of its scent and flavor, and for which a remedy is eagerly sought.

"The old-fashioned native apparatus consists of six iron boilers heated by charcoal, and having spaces above, which are fitted with rattan covers. When the dust is to be steamed it is spread out on a sheet of cotton cloth placed over the boiler and covered up; but with the improved European apparatus the dust is simply put into iron boxes and the steam then passed through them. After having been sufficiently steamed to make it adhesive, the dust is put into a strong wooden mould, on the movable cover of which the trade mark of the 'hong' or firm is engraved (so as to leave the corresponding impression on the brick), and firmly wedged down. It is then pressed and placed on one side for two or three hours to cool. Each brick should weigh one catty (one and a third pounds), and all those that do not come up to the proper standard of weight or are defective in any way are rejected and re-made. For this purpose they are taken to a rotatory mill, constructed of two heavy circular stones moved by a horizontal wooden bar, and working in a channel where the condemned bricks are thrown, and crushed as the wheels pass over them. Having again become dust, the operation already described is in all its details repeated. The hand press turns out sixty baskets a day with twenty-five per cent. of failure bricks, while the steam press produces eighty baskets a day, with only five per cent. of bad work, and the saving by the employment of the improved machinery amounts to one tael a basket, or, according to the above stated out-turn, eighty taels a day, or about £20 sterling. The bricks found to be correct in weight and free from defects are stored in the drying room for a week, when they are carefully wrapped separately in paper, and packed in Bamboo baskets containing sixty-four bricks each. Green brick tea is made in the same manner, but of leaf, not dust, and the bricks are larger, weighing two and a half pounds each, thirty-six going to a basket when packed for export."

There is an important article, too, on the timber-trees of the Straits Settlement, in which the botanical identifications of the trees producing the various timbers are given, with descriptions of these and their weight. One hundred and fifty different timbers are described in this list, the value of which is increased by the addition of an index of native and scientific names. The issue ends with a mass of correspondence carried on by the authorities of Kew with regard to west African cotton, with the view of calling attention to the subject of cotton-growing generally in this part of the world.

The June Exhibition of the Massachusetts Horticultural Society.

THE first of the principal summer exhibitions of the Massachusetts Horticultural Society is devoted primarily to Roses and Strawberries, although it serves to bring together always large collections of the other flowers, fruits and vegetables of the season. This exhibition was held in Boston last week and attracted the usual number of people which the queen of flowers always brings together in that horticultural centre. As far as the roses were concerned, the exhibition must be considered an average one only. Much better roses than those which were shown last week have been seen in Boston, and there have been many years when the flowers fell far below those of this season in quality and in numbers. As usual, the roses were well shown in the English fashion, in flat boxes, the tin cups holding the flowers being hidden by a covering of moss, which makes the best possible setting for the individual flowers. The roses, as a whole, were distinguished by a remarkable evenness of excellence which must have made judging a difficult matter, by good foliage and by flowers well colored but lacking something of substance, and certainly not of such enormous size as these shows have sometimes called out.

The Lyman plate for the best twenty-four named varieties of Hardy Perpetuals went to John B. Moore & Son, the second and third prizes in this class going to J. S. Fay of Woods Holl, a new exhibitor of roses, and to Warren Hustis & Son, of Belmont. President Spooner's special prize for the best twelve blooms of Ulrich Brunner went to Mrs. F. B. Hayes, of Lexington, for twelve very perfect flowers. In the class of twenty-eight distinct named varieties, Mr. John L. Gardner, of Brookline, carried off the highest honors. Very fine specimens of the American Beauty were staged by President Spooner, who also secured the first prize for the best eighteen varieties.

The following is a list of the varieties of Hybrid Perpetual Roses that appeared on the first-prize stands, the figure after some of the names referring to the frequency of their occurrence in different exhibits: Abel Carrière (3), Alfred Colomb (5), Antoine Mouton, Baroness Nathaniel de Rothschild, Baroness Rothschild (5), Beauty of Waltham, Boieldieu (3), Camille Bernardin (3), Catherine Soupert, Charles Darwin, Charles Lefebvre (4), Comte de Paris, Comte de Raimbaud, Comtesse de Chabrillant, Countess of Oxford (4), Devienne Lamy, Dr. Sewell, Duchess of Bedford, Duchesse de Bragance, Duchesse de Vallombrosa, Duke of Edinburgh (3), Dupuy Jamain, Earl of Dufferin, Eclair, Edouard Morren, Emily Saxton, Etienne Levet (4), Eugenie Verdier (2), Fisher Holmes, General Appert, General Jacqueminot, Gloire Lyonnaise (2), Glory of Cheshunt, Heinrich Schultheis (2), Madame Alfred Rougemont, Mabel Morrison, Madame Boll, Madame Boutin, Madame Clemence Joigneaux, Madame Eugene Verdier, Madame Gabriel Luizet (7), Madame Julie Daran, Madame Marius Cote, Madame Montet, Madame Victor Verdier, Mlle. Emilie Verdier, Marchioness of Exeter, Maréchal Vaillant, Marguerite de St. Amand, Marie Baumann, Marie Finger, Marquise de Castellane (2), Maurice Bernardin (2), Merveille de Lyon (3), Miss Hassard, Mons. Boncenne (3), Mons. E. Y. Teas, Mrs. Turner, Mrs. John Laing (2), Oxonian, Paul Neyron, Penelope Mayo, Princess Louise (2), Prosper Langier, R. Dudley Baxter (new), Richard Wallace (2), Rosieriste Jacobs, Sir Garnet Wolseley, Thomas Mills (2), Ulrich Brunner (3), Victor Verdier (2), and White Baroness.

A collection of single Roses exhibited by the Arnold Arboretum attracted a good deal of attention, and the beauty of these flowers, judging by the amount of space given up to an account of them in the Boston papers, must have been a surprise to many people.

A few Orchids were shown by Mr. N. T. Kidder, of Milton, Mr. John L. Gardner, of Brookline, and Mr. E. W. Gilmore, of North Easton. Flowering Plants other than Orchids were not of first quality, and it is a commentary on the present state of horticulture in this country when a common scarlet Geranium makes its appearance on the exhibition stage in a class of greenhouse flowering plants.

Among Strawberries, Jewell, a light colored, well shaped berry which many people in the neighborhood of Boston have thought the best Strawberry of the season, won the highest honors, Mr. Samuel Barnett carrying off the Lyman plate with a basket of splendid fruit. Belmont was considered only second to Jewell. Mr. Benjamin F. Smith, of Cambridge, received the Society's silver medal for the best seedling, never having taken a prize, with Beverly. The exhibition of strawberries was, on the whole, very fair; and the size and beauty of the fruit has not been surpassed for many years. Strawberries, however, in

eastern Massachusetts, this season, lack something in flavor owing to the excessive moisture of the season and the absence of sun at the time the fruit was coloring. O. R. Robbins received the first prize, and Edward Hastings the second for two quarts of any variety of Cherries with handsome, well colored fruit of Black Tartarian.

The interest of the exhibition to lovers of wild plants was increased by large collections of these flowers, which are a specialty always at the Massachusetts shows.

Jacob Manning, of the Reading Nurseries, staged a large collection of hardy herbaceous plants, which we should be glad to describe more in detail, if room could be found.

Not the least attractive part of this exhibition was the display of Fox Gloves, grouped on the stage at the end of the upper hall, which produced a remarkable and striking effect.

Notes.

The profits accruing to the government from the sale of the fruit of the trees (chiefly Cherries) planted along the highways of Saxony amounted in the year 1889 to $35,480.

In making hairpins for ladies' use an excellent aid to the gardener was unwittingly provided. Of many lengths and varying in thickness from a stout to an almost thread-like wire, there is nothing so handy for pegging down plants in the border.

Mr. Barkett, gardener to Lord Penzance, recently received a first-class certificate from the Royal Horticultural Society for a hybrid between the Sweet-Brier and Harrison's Yellow Rose. The foliage is larger than that of the Sweet-Brier, and somewhat fragrant; the flowers are single, two inches in diameter, pale salmon with a yellow centre.

Among the most interesting contributions made in recent years to the history of decorative art have been Mr. William H. Goodyear's speculations on the rôle played by the Egyptian Lotus in the ornamentation of Oriental, classic and more modern nations. Originally presented in lecture form, they have since been published in the *American Architect and Building News*; and now it is announced that they will be reproduced in atlas form, with illustrations of 2,500 objects and details, under the title "Grammar of the Lotus." An English gentleman, persuaded thereto by Miss Amelia B. Edwards, the well known Egyptologist, will supply the money for this costly enterprise.

In a late number of the *Illustrirte Gartenzeitung*, of Vienna, long quotations are made from the articles on *Taxodium distichum*, *Aster ptarmicoides* and *Aralia Cashmirica*, recently published in GARDEN AND FOREST, and to the Arnold Arboretum is given the credit for having introduced the last-named plant to European cultivators. Among the novelties recommended to its readers by the same issue of this journal are a number of plants of American origin; the Snowflake Rose, introduced by the Messrs. Strauss & Company, of Washington, *Ipomœa setosa*, *Euphorbia heterophylla*, introduced by Mr. L. W. Goodell, of Dwight, Massachusetts, and several Pines from our western states and from Mexico, which are not unknown in Europe but have been lost to cultivation in consequence of planting in regions of insufficient warmth.

A correspondent of the *Bulletin of the Torrey Botanical Club* says that half the 12,000 portraits of distinguished men of all times contained in the Wolff Collection of Engravings, recently presented to the Syracuse University, has now been catalogued, and that the list includes the names of 144 botanists. Modern celebrities are, of course, included, but the collection is especially rich in pre-Linnæan portraits. Nor did the collector confine himself to single examples, for six different portraits of Kaspar Bauhin are noted, seven of Erasmus Darwin, fifteen of Humboldt and no less than twenty-seven of Linnæus. Every style of engraving is represented, and the plates vary from duodecimo to folio size. If the University will permit historians and essayists to reproduce these portraits, the collection will be a most valuable possession to the country at large.

In a private letter recently received from Mr. C. G. Pringle, now engaged in exploring the flora of northern Mexico, he writes: "I find myself well located here for exploring the rich region between this city and Tampico. Twice a week at midnight a train leaves here for that place. About eight A. M. we enter the head of a wonderful cañon (3,100 feet elevation), which is full of profuse vegetation. After fifteen miles the train emerges from the cañon at eleven hundred feet elevation and enters the tropical forests of the lowlands. In my last trip of two days in the upper end of the cañon I gathered five hundred specimens in forty species, half trees, and shrubs. There are a very few species here which I know. I have to come back here to dry my plants, as I can get food and shelter in only a few places below, and the vermin in woods and hovels are terrible pests. The rainy season has set in heavily. All the table-land has been dry and brown so far. My prospects are good."

French journals tell us that the estate of Elven, in Brittany, is offered for sale at the price of $60,000. A better investment for this amount of money could hardly be imagined if the purchaser cared for picturesque surroundings and historic interest. Elven lies in a romantic country, close to Morbihan, the ancient stronghold of the Druids, near which stand the prehistoric dolmens of Carnac, while Auray, where King Arthur is fabled to have dwelt, is not far away. The estate itself comprises about 450 acres and a fairly well preserved castle with some other buildings. In this castle Henry Tudor, later King Henry VII. of England, was imprisoned when, after his mother's defeat at the battle of Tewkesbury, he was driven by a storm to the coast of Brittany and seized by its Duke. But the present generation will probably be more interested by the fact that it is the half-ruined tower of Elven which plays so prominent a part in Feuillet's "Romance of a Poor Young Man."

American Horticulture and more especially American Pomology has sustained a serious loss in the death of Patrick Barry. For fifty years he has been an active member of the firm which from small beginnings became famous the world over for enterprise, for accuracy and for business integrity. He has been untiring, too, with his pen, and as author and editor he always had some instructive message, and he always delivered it in a way that compelled attention. Many of the best horticultural societies of the country owed much to his organizing faculty and administrative force, so that it might be said that his influence has reached every orchard and garden of the country.

Patrick Barry was born near Belfast, Ireland, in 1816, and, reaching this country at the age of twenty years, he began his life-work as a clerk in the then celebrated nurseries of the Princes, at Flushing, Long Island. Four years later, with small capital, but with the knowledge of the business which he had acquired by a quick intelligence and persevering industry, he formed the partnership with Mr. George Ellwanger, in Rochester, in a business which since that time has constantly grown in power and influence and has become an honor to the nursery trade of the world.

While he was skilled in all branches of horticulture, he was specially devoted to pomology, and forty years ago his first popular work, entitled "The Fruit Garden," placed him in the front rank, with Downing and Thomas, as an authority in this field. Soon after he became editor of *The Horticulturist*, and conducted it with great spirit and intelligence until it was removed to Philadelphia. In 1860 he became Horticultural Editor of the *Genessee Farmer* and for six years was a constant contributor to that journal. For more than thirty years he was President of the Western New York Horticultural Society, a model organization of its kind, in which position he was always ready not only to give it his counsel, his time and his labor, but to make up any deficit in its treasury when its expenses were greater than its income. He has also been a member of the Board of Control of the State Agricultural Experiment Station, and here, as in other positions of trust, he gave his best thought to his labors for others.

Perhaps his most valuable work was the "Fruit Catalogue" of the American Pomological Society, which has been accepted as the standard authority on this subject, not only in this country, but throughout the world. He was Chairman of the General Fruit Committee of this body practically from its beginning, and the Fruit List, which is an exhaustive catalogue of the different varieties of fruits, with their peculiar qualities and degree of adaptation to different geographical locations, was his original conception and was practically carried out by him. But his restless activity was manifested in many other directions. He had accumulated a liberal fortune, and he was identified with the leading financial and philanthropic enterprises of the city of his adoption. Altogether he was a man of rare executive force, sterling judgment, and what was more important, of high character in all the relations of life. Honorable in business, liberal in charities, consistent in his religious profession, he won the hearty affection of those who knew him intimately and commanded the respect and confidence of the entire community.